REMARKS

Claims 1, 3-21 are pending in the present application. By this amendment, claims 1 and 10 are amended without adding any new subject matter. In the Office Action, the Examiner objected to claims 1 and 10. Applicants respectfully request that the Examiner's objections to claims 1 and 10 be withdrawn.

The Examiner rejected claims 1 and 3-21 under 35 U.S.C. §112, second paragraph. Applicants respectfully disagree. However, Applicants appreciate the suggestions of the Examiner regarding independent claims 1 and 10. As amended, claims 1 and 10 clarify the objected features therein.

With regard to claim 1, the method is amended for forming at least two error control coded streams using a separate error code encoder for each stream. As described in the Specification, on page 9, lines 7-13, both Chase packet and IR sub-packet protocols may be used for multiple error coded streams. Consequently, the receiver in combination with the previously received failed transmission(s) decodes each received Chase packet. Similarly IR protocol may also be employed. Therefore, Applicants respectfully submit that claims 1 and 10 are supported by the Applicants' Specification.

The M. P. E. P. requires that the written description be "concise." That is, obvious or minor details need not be explained--while the disclosure must be sufficient, it must not be all encompassing. In other words, the Specification need describe the invention only in such detail as to enable a person skilled in the most relevant art to make and use it. Accordingly, Applicants respectfully submit that the Examiner's objections of claims 1 and 10 and 3-21 under 35 U.S.C. §112, second paragraph, be withdrawn.

Claims 1 and 3-21 stand rejected under 35 U.S.C. §103(a) as allegedly being obvious over ***Walton*** in view of ***Jalali***. The Examiner's rejections are respectfully traversed.

As the Examiner well knows, to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on Applicants' disclosure. Moreover, all the claim limitations must be taught or suggested by the prior art. If an independent claim is nonobvious under 35 U.S.C. § 103, then any claim depending therefrom is nonobvious.

With respect to alleged obviousness, there must be something in the prior art as a whole to suggest the desirability, and thus the obviousness, of making the combination. In fact, the absence of a suggestion to combine is dispositive in an obviousness determination. The mere fact that the prior art can be combined or modified does not make the resultant combination obvious unless the prior art also suggests the desirability of the combination. The consistent criterion for determining obviousness is whether the prior art would have suggested to one of ordinary skill in the art that the process should be carried out and would have a reasonable likelihood of success, viewed in the light of the prior art. Both the suggestion and the expectation of success must be founded in the prior art, not in the Applicant's disclosure.

With regard to independent claim 1, Applicants describe and claim, among other things, a method of processing a block of information comprising forming at least two error control coded

streams, using a separate error code encoder for each stream, from the block of information. The formed error control coded streams are transmitted in response to a confirmation message.

Walton describes selecting transmission channels for use for data transmission and to process and transmit data over the selected transmission channels. Data for a group may be coded and modulated based on the scheme selected for the group. Only good channels in each group may be used and by matching the data processing for the selected channels to the capacity achievable by the channels, uniform transmit power allocation is achieved. The selective channel transmission may use only the best transmission channels in each group, which are selected from among all available transmission channels in the group. The total available transmit power is allocated amongst only the selected transmission channels. By matching the data processing for the selected transmission channels to the capacity achievable for these channels, transmission on multiple transmission channels with different capacities is provided in a multiple-input multiple-output (MIMO) communication system. See ***Walton,*** column 2, lines 37-44.

Jalali is directed to a communications system capable of efficiently supporting both voice and data services. The communications system employs multi-carrier modulation to transmit data for different types of services. To support multiple types of services, a transmitter unit includes one or more encoders, a symbol mapping element, and a modulator. Each encoder receives and codes a respective channel data stream to generate a corresponding coded data stream. The symbol mapping element receives and maps data from the coded data streams to generate modulation symbol vectors, with each modulation symbol vector including a set of data values used to modulate a set of tones to generate an OFDM symbol. The modulator modulates the modulation symbol vectors to provide a modulated signal suitable for transmission. The data

from each coded data stream is mapped to a respective set of one or more "circuits". Each circuit can be configurabaly defined to support a different type of service. See ***Jalali,*** column 33, line 66- column 34, line 17.

However, Applicants respectfully submit that based on the above-indicated legal standard the pending claims are not obvious in view of ***Walton*** and ***Jalali***, either considered alone or in combination. As discussed above, ***Walton*** does not use confirmation messages. The Examiner concedes that ***Walton*** fails to teach or suggest the limitation of claim 1 as to confirmation messages, such as ACK or NAK messages. *See*, the Office Action dated January 24, 2006 at page 6. The Examiner relies on ***Jalali*** to teach this limitation. In particular, the Examiner asserts that ***Jalali*** teaches claim 1 features in that confirmation messages such as ACK or NAK messages are used for an automatic retransmission protocol. In this way, the Examiner concludes that since ***Jalali*** teaches use of confirmation messages of an automatic retransmission protocol, then ***Jalali*** discloses at least two separately formed error coded streams being transmitted in response to a confirmation message.

There are several problems with the Examiner's position. As an initial matter, it is well-established that the prior art references, when considered alone or in combination, must teach each and every claimed feature exactly. One problem with the Examiner's rejection is that it is not supported by the very reference upon which he relies. In ***Jalali***, data transmission frames received in error may be retransmitted. *See* ***Jalali***, column 2, lines 26 - 33. Put another way, ***Jalali*** does not teach transmitting error controlled coded streams in response to a confirmation message. It teaches retransmitting data frames if and when they are received in error instead of two or more bit streams being error coded (*e.g.*, per-stream encoded) to allow each to be transmitted and/or received by at least one antenna of a multiple antenna system. Use of

protocols such as Chase and IR that may work in conjunction with the channel coding and modulation to improve the reliability is not described by ***Jalali*** in a manner such that each of the at least two error coded streams may be transmitted in response to a confirmation message. ***Jalali*** is silent about selectively and independently using different re-transmitting techniques across multiple HARQ formatted streams of bits, multiple error control coded streams of packet(s) or sub-packet(s) that may be simultaneously created and transmitted. See, Applicants' Specification, on page 4, line 18 – page 5, line 3. Absent any specific teaching and/or suggestion of the features set forth in claim 1, mere use of a retransmission protocol described by ***Jalali*** cannot increase the throughput in a wireless communication system that may employ multiple antenna system even when combined with teachings of ***Walton***. Thus, clearly, the Examiner cannot rely on ***Jalali*** to supply the missing claimed features.

The Examiner does not cite to any other reference to show the features recited in claim 1. Instead, the Examiner advances a conclusory statement that ***Jalali*** teaches that the formed error control coded streams being transmitted in response to a confirmation message. Such a conclusory statement is clearly deficient.

Because the Office provides no citations in ***Jalali*** and/or cites other ***reference(s)*** to support this "obviousness" assertion, Applicants can only infer that the Examiner makes this assertion based on personal knowledge. However, no supporting affidavit has been made of record. *See* M.P.E.P. § 2144.03.

However, the Examiner concludes that it would have been obvious to modify ***Walton*** so that the MIMO radio transmission system arrangements with FEC encoding of data would provide increased reliability. The rationale to modify ***Walton*** by the teachings of ***Jalali*** is

indicated to be an advantage of providing additional reliability to FEC encoded data by means of a retransmission protocol involving confirmation messages.

While ***Jalali*** teaches that the data frames may be retransmitted, transmission of two separately formed error controlled coded streams responsive to a confirmation message is not taught or even remotely suggested. Since ***Jalali*** is completely silent with respect to even the suggestion to using a confirmation message based transmission of error controlled coded data, it is respectfully submitted that the combination of ***Walton*** and ***Jalali*** fails to present a *prima facie* case of obviousness with respect to the claimed invention set forth in claim 1. Therefore, ***Jalali*** fails to teach or suggest that the formed error controlled coded streams are being transmitted based on a confirmation message. Furthermore, neither ***Walton*** nor ***Jalali*** provide any suggestion to modify or combine the prior art as suggested by the Examiner so as to arrive at Applicants' claimed invention.

Applicants respectfully request the rejection of claims 1 and 3-21 over ***Walton*** and ***Jalali*** be reconsidered because the prior art does not teach or suggest any of the pending claims.

Regarding claims 3-8 and 13-21, the Examiner takes Official Notice, asserting that other than the application to parallel streams the recited limitations are conventional for a chase decoding or an incremental Redundancy Protocol. The Examiner further asserts that the suitability of a chase decoding or an incremental Redundancy Protocol in an ARQ-FEC system was known at the time the invention was made. The Examiner concludes that it would have been obvious to a person having ordinary skill in the art at the time of the invention was made to apply a chase protocol or incremental Redundancy Protocol to the error control processing in the above indicated combination of ***Walton*** and ***Jalali***. The Examiner further alleges that such an application would have been obvious because the suitability of a chase decoding or an

incremental Redundancy Protocol, in an ARQ-FEC system was already well known. The Applicants respectfully disagree. The Examiner provides no specific citations in ***Walton*** and/or cites other ***reference(s)*** to support this "obviousness" assertion. Thus, none of the cited art remedy the aforementioned fundamental deficiencies of the primary reference. For this reason alone, claims 3-8 and 13-21 are allowable.

Regarding claims 10-12, the Examiner states that the corresponding FEC decoding arrangements allegedly provide independent error detection since ***Walton*** requires separate FEC encoding in Figure 4c. Regarding claim 9, the Examiner alleges that ***Walton*** provides a many-to-many communication system at least in terms of antenna paths. The Applicants respectfully disagree. The Examiner provides no citations in ***Walton*** and/or cites other ***reference(s)*** to support this "obviousness" assertion. Accordingly, Applicants infer that the Examiner makes this assertion based on personal knowledge, which is improper. The Examiner is respectfully requested to provide a cite in a reference for each instance where a conclusary statement is made.

Claim 1 stands rejected under 35 U.S.C. §102(e) as allegedly being anticipated by U.S. Patent Application Publication No. 2002/0027956 to Lee et al. (hereafter ***Lee***). Applicants respectfully traverse the Examiner's § 102 rejections. An anticipating reference, by definition, must disclose every limitation of the rejected claim in the same relationship to one another as set forth in the claim. Claim 1, among other things, calls for a method of processing a block of information comprising forming separately at least two error control coded streams from the block of information. Based on the above-indicated legal standard, it is respectfully submitted that the ***Lee*** reference fails to anticipate claim 1. Thus, claim 1 and claims dependent therefrom are in condition for allowance which is respectfully requested of the Examiner.

With regard to independent claim 1, Applicants describe and claim, among other things, forming at least two error control coded streams using a separate error code encoder for each stream. As shown in Figure 3, for each error coded stream, 225_1 through 225_p, Chase packet(s) or IR sub-packet(s) may be created from a corresponding channel coded and modulated stream of bits.

The Examiner relies upon the ***Lee*** reference to teach the above set-forth features of independent claim 1. The Applicants respectfully submit that ***Lee*** fails to teach one or more features set forth above in claim 1. Accordingly, the Applicants disagree with the Examiner's rejection.

The Examiner alleges that ***Lee*** discloses a wireless data transmission arrangement including transmitter circuitry (FIG. 6) comprising a pair of turbo code encoders (504, 512) for "forming separately at least two error control coded streams" from a "block of information". Separate antennas (path 1, path 2) are used by ***Lee's*** transmitter to transmit the respective "error control coded streams". The Examiner further alleges that ***Lee's*** data transmission arrangement further uses an ARQ protocol, and therefore transmits this data in response to a "confirmation message" of the ARQ protocol.

Lee is directed to encoding an information bit sequence into a plurality of encoded bit sequences differently for transmitting a signal in a communication system. ***Lee*** forms plurality of encoded bit sequences. See ***Lee***, paragraph [0045] on page 3. In ***Lee***, the same information bit sequence is encoded in a different output order to provide differently encoded bit sequences that may be transmitted either with transmit diversity, or alternatively, using a single H-ARQ method. See ***Lee***, Abstract. This H-ARQ method transmits a different signal for the

"Retransmit" signal that has different parity bits from the "New" signal and combines the differently encoded bit sequences at the receiver. See ***Lee***, paragraphs [0059] – [0061] on page 4.

Lee does not form multiple error control coded streams using separate error code encoders for each stream. Instead, encodes the same information bit sequence into a plurality of encoded bit sequences differently. As understood, ***Lee*** fails to teach or suggest separately formed multiple error control coded streams. Rather, use of a single H-ARQ method is taught for a plurality of encoded bit sequences differently. Therefore, ***Lee*** is completely silent with regard to forming at least two error control coded streams using separate error code encoders for each stream. To the contrary, ***Lee*** teaches that one H-ARQ method may be used for all the differently encoded bit sequences when transmit diversity is not used.

For at least the aforementioned reasons, Applicants respectfully submit that the present invention is not anticipated by ***Lee*** and request that the Examiner's rejection of claim 1 under 35 U.S.C. §102(e) be withdrawn.

Claims 1 and 3-9 stand rejected under 35 U.S.C. §102(e) as allegedly being anticipated by U.S. Patent Application Pub. No. 2003/0072285 to Onggosanusi et al. (hereafter ***Onggosanusi***). Applicants respectfully traverse this rejection. Applicants respectfully submit that these are rejections that have been already addressed by the Applicants in the Amendment, which was filed on April 28, 2005. Recalling claim 1, at least two separately formed error control coded streams are independently transmitted in response to a confirmation message. However, ***Onggosanusi*** is silent with regard to forming at least two error control coded streams using separate error code encoder for each stream from the processed block of information and independently transmitting each of the at least two error control coded streams by a single corresponding antenna of a multiple antenna system.

The Examiner asserts that ***Onggosanusi*** discloses a MIMO hybrid-ARQ system with Chase packet error correction decoding or Incremental Redundancy sub-packet error correction decoding. Rather, ***Onggosanusi*** describes a method in which data in a frame is first encoded, interleaved, modulated and then split into P sub-streams. *See*, the paragraph [0014] on page 1 in the ***Onggosanusi*** reference. ***Onggosanusi*** teaches away from separately forming an error control coded stream, let alone separately forming at least two error control coded streams from the processed block of information for independent transmission thereof by a respective antenna of a multiple antenna system. Thus, claim 1 is in condition for allowance which is respectfully requested of the Examiner.

Regarding clam 9, the Examiner notes that the system disclosed by ***Onggosanusi*** can be considered a "one-to-many" communication system" as a single base station typically communicates with several mobile units. None of the cited references, considered either alone on or in combination, teach or suggest all of the claimed features of independent claim 1. Therefore, claims 3-9 depending therefrom are also in condition for allowance, which is respectfully requested of the Examiner.

Claims 1, 3, 4, and 7-9 were rejected under 35 U.S.C. §102(e) as allegedly being anticipated by U.S. Patent No. 6,771,705 to Kenney et al. (hereafter ***Kenney***). The Examiner's rejections are respectfully traversed. Accordingly, reconsideration of the §102 rejection of claims 1, 3, 4, and 7-9 is requested.

Unlike forming separately at least two error coded streams from a processed block of information, as claimed in amended claim 1, ***Kenney*** generates two copies of the same parity data for the systematic data and the interleaved systematic data to create different parity data subsets which may be utilized in independent combinations across two channels for

transmissions via different antenna processors for successful reception of the systematic data. The generated parity information for the systematic data is then passed to demultiplexer and puncture unit 202 to be duplicated. See ***Kenney,*** col. 4, lines 21-23. The generated parity information for the interleaved systematic data is then passed to a demultiplexer and puncture unit 205 to be duplicated. See ***Kenney,*** col. 4, lines 36-38.

The Examiner alleges that ***Kenney*** discloses a wireless data transmission arrangement including transmitter circuitry (FIG. 2) comprising a pair of turbo code component encoders (201, 204) for "forming separately a least two error control coded streams" from a block of information." The Examiner states that separate antennas (113, 114) are used by ***Kenney's*** transmitter to transmit the respective "error control coded streams." The Examiner concludes that ***Kenney's*** data transmission arrangement further uses a hybrid ARQ protocol with incremental redundancy (col. 7, lines 26+), and therefore transmits this data in response to a "confirmation message" or the ARQ protocol.

Instead, by creating different parity data subsets which may be utilized in independent combinations for successful reception of the systematic data, ***Kenney*** combines, with the systematic data, only a selected subset of parity data generated from the non-interleaved systematic data by encoder 201 and a selected subset of parity data generated from the interleaved systematic data by encoder 204 for transmission on a given channel within the transmitter diversity wireless communications system. In the embodiment shown in FIG. 2, parity data subset 1 (generated from the non-interleaved systematic data) and parity data subset 3 (generated from the interleaved systematic data) are concatenated, together with the non-interleaved systematic data, by multiplexer 206 for transmission over one channel (i.e., via antenna 113). See ***Kenney,*** col. 4, lines 45-47 and lines 63-68. Accordingly, the ***Kenney***

reference fails to anticipate the claim limitations of claim 1 and other rejected claims. Thus, claims 1, 3, 4, and 7-9 are in condition for allowance.

Claims 10-21 are rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,909,758 to Ramesh et al. (hereafter ***Ramesh***). Applicants respectfully disagree with the Examiner's rejection.

Claim 10 calls for a method of processing received error control coded streams that are formed separately. The method comprises performing independent error detection of at least two of the received error control coded streams in a multiple antenna system, wherein at least one confirmation message is transmitted in response to the performed independent error detection. ***Ramesh*** does not describe independent error detection of the separately or independently formed error coded streams received in a multiple antenna system, as disclosed in the Applicant's specification, so the ***Ramesh*** reference fails to anticipate claim 10 limitations. To the contrary, ***Ramesh*** teaches a way for decoding data blocks to enable a receiving device to decode a retransmitted data block using previously stored bits.

The Examiner alleges ***Ramesh*** discloses a wireless data transmission arrangement of a "multiple antenna system" including a transmitter that separately forms two error control coded streams (col. 7, lines 11+) and a receiver that "performs independent error detection of at least two of the received error control coded streams," using a CRC decoding (col. 8, lines 24+) and returns a negative "confirmation message" (NACK) to the transmitter when decoding is not successful.

Rather than forming separately at least two error coded streams from a processed block of information, as claimed in amended claim 10, ***Ramesh*** performs puncturing operations on two different copies of the data block. See ***Ramesh,*** col. 7, lines 11-12. A puncturing is

conventionally performed on an encoded bit sequence so that the resulting coding rate can be matched with the required coding rate. In other words, the ***Ramesh*** reference appears to be completely silent with respect to performing independent error detection of at least two of the received error control coded streams. For at least this reason alone, the Examiner is respectfully requested to reconsider the rejection of claims 10-21 over the ***Ramesh*** reference.

In view of the foregoing, Applicants respectfully submit that all pending claims are in condition for allowance. The Examiner is invited to contact the undersigned at (713) 934-4050 with any questions, comments or suggestions relating to the referenced patent application.

Respectfully submitted,

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